Appln. No.: 09/857,386

Amendment dated November 3, 2004

<u>Amendments to the Claims:</u> This listing of claims will replace all prior versions, and listings, of claims in the application

## Listing of Claims:

- 1. (Previously Presented) A process of treating internal combustion engine exhaust gas containing  $O_2$ , NOx, unburnt hydrocarbon ("HC"), CO and soot, comprising the steps of:
- i. contacting the engine exhaust gas with a first catalyst adapted to be fed with the engine exhaust gas and effective to promote oxidation of HC, to oxidize a substantial part of the HC;
- ii. contacting the engine exhaust gas that has passed over the first catalyst with a second catalyst effective to promote the catalytic oxidation of NO to  $NO_2$ , to oxidize NO to  $NO_2$ .
- iii. collecting soot on a filter adapted to be fed with the engine exhaust gas that has passed over the first and second catalysts; and
- iv. combusting the collected soot by reaction with the catalytically oxidized  $NO_2$  and the  $O_2$ .
  - 2. (Cancelled)
  - 3. (Cancelled)
- 4. (Currently Amended) <u>Process-A process</u> according to claim 1, wherein the first and second catalysts are honeycomb-supported.
- 5. (Currently Amended) Process-A process according to claim 4, wherein the honeycomb defines cells having a cell density of the honeycomb is in the range of 100-900 per square inch.
- 6. (Currently Amended) <u>Process A process</u> according to claim 1, further comprising <u>the</u> step of cooling the engine exhaust gas leaving the first catalyst and before the engine exhaust gas contacts the second catalyst.

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7. (Currently Amended) Process A process according to claim-6\_1, wherein the step of-oxidizing contacting the exhaust gas with a first catalyst to oxidize a substantial part of the HC is carried out close to the source of the engine exhaust gas, whereby a maximum convenient operating temperature and reaction rate is obtained.

- 8. (Cancelled)
- 9. (Currently Amended) <u>Process A process</u> according to claim 6, further comprising the step of providing an increased amount of a combustible upstream of the first catalyst to increase the temperature at which step i operates.
- 10. (Currently Amended) <u>Process A process</u> according to claim 9, wherein the combustible is provided by modifying engine settings to pass more HC and/or generate more CO.
- 11. (Currently Amended) Process according to claim-6 1, wherein the first catalyst for effecting step i has a very low light-off temperature for HC and CO oxidation.
- 12. (Currently Amended) <u>Process\_A process\_according to claim 1, wherein</u> the HC is absorbed on the soot.
- 13. (Currently Amended) <u>Process-A process</u> according to claim 1, further comprising the step of removing NOx downstream of the step of combusting the collected soot.
- 14. (Currently Amended) <u>Process A process</u> according to claim 13, wherein the step of removing NOx is through a regenerable NOx absorber.
- 15. (Currently Amended) <u>Process A process</u> according to claim 14, further comprising the step of catalytically removing NOx downstream from the NOx absorber.
- 16. (Currently Amended) A system for treating internal combustion engine exhaust gas containing  $O_2$  NOx, unburnt hydrocarbon ("HC"),  $CO_2$  and soot, comprising:

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i. a first catalyst adapted to receive the engine exhaust gas and effective to promote oxidation of HC therein for oxidizing a substantial part of the HC;

- ii. a second catalyst adapted to receive the engine exhaust gases that have passed over the first catalyst and disposed downstream of the first catalyst, the second catalyst effective to promote oxidation of NO to NO<sub>2</sub>; and
- iii. a filter adapted to receive the engine exhaust gases that have passed over the first and second catalysts, the filter effective to collect and retain soot for combustion by reaction with the  $NO_2$  and the  $O_2$ .
- 17. (Previously Presented) The system according to claim 16, wherein the first and second catalysts are honeycomb-supported.
- 18. (Currently Amended) The system according to claim 17, wherein the cell density of the honeycomb is defines cells having a density in the range of 100-900 per square inch.
- 19. (Previously Presented) The system according to claim 16, wherein the internal combustion engine is a diesel engine.
- 20. (Previously Presented) The system according to claim 19, wherein the diesel engine is designed for light duty applications.
- 21. (Previously Presented) The system according to claim 20, wherein the diesel engine is a turbo-charged direct injection type.
- 22. (Previously Presented) The system according to claim 19, wherein the diesel engine is a heavy duty engine.
- 23. (Previously Presented) The system according to claim 16, wherein the first catalyst is positioned close to the second catalyst.
- 24. (Previously Presented) The system according to claim 16, wherein the first catalyst and the second catalyst are at opposite ends of a single catalyst monolith.

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- 25. (Currently Amended) <u>Process A process</u> according to claim 1, wherein the step of oxidizing a substantial part of the HC over a first catalyst further comprises oxidizing some NO to NO<sub>2</sub>.
- 26. (Previously Presented) A process according to claim 1, wherein the first catalyst comprises at least one supported platinum group metal (PGM).
- 27. (Previously Presented) A process according to claim 26, wherein the at least one supported PGM is selected from the group consisting of platinum, palladium and rhodium.
- 28. (Previously Presented) A process according to claim 27, wherein the at least one PGM is platinum and palladium.
- 29. (Previously Presented) A process according to claim 27, wherein the support is selected from the group consisting of alumina, ceria and alumina and ceria.
- 30. (Previously Presented) A process according to claim 28, wherein the support is selected from the group consisting of alumina, ceria and alumina and ceria.
- 31. (Previously Presented) A process according to claim 1, wherein the first catalyst comprises a first layer comprising platinum-catalyzed alumina and a second layer comprising ceria overlying the first layer.
- 32. (Currently Amended) A process according to claim 26, wherein the at least one supported PGM comprises from 10-150g/ft<sup>3</sup> platinum.
- 33. (Previously Presented) A process according to claim 1, wherein the second catalyst comprises at least one supported platinum group metal (PGM).
- 34. (Previously Presented) A process according to claim 33, wherein the at least one supported PGM is selected from the group consisting of platinum, palladium and rhodium.
- 35. (Previously Presented) A process according to claim 34, wherein the at least one PGM is platinum.

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- 36. (Currently Amended) A process according to claim-35\_33, wherein the support is alumina.
- 37. (Previously Presented) A process according to claim 35, wherein the at least one PGM comprises from 10-150g/ft<sup>3</sup> platinum.
- 38. (Previously Presented) The system according to claim 16, wherein the first catalyst comprises at least one supported platinum group metal (PGM).
- 39. (Previously Presented) The system according to claim 38, wherein the at least one supported PGM is selected from the group consisting of platinum, palladium and rhodium.
- 40. (Previously Presented) The system according to claim 39, wherein the at least one PGM is platinum and palladium.
- 41. (Previously Presented) The system according to claim 39, wherein the support is selected from the group consisting of alumina, ceria and alumina and ceria.
- 42. (Previously Presented) The system according to claim 40, wherein the support is selected from the group consisting of alumina, ceria and alumina and ceria.
- 43. (Previously Presented) The system according to claim 39 comprising a first layer comprising platinum-catalyzed alumina and a second layer comprising ceria overlying the first layer.
- 44. (Previously Presented) The system according to claim 39, comprising from 10-150g/ft<sup>3</sup> platinum.
- 45. (Previously Presented) The system according to claim 16, wherein the second catalyst comprises at least one supported platinum group metal (PGM).
- 46. (Previously Presented) The system according to claim 45, wherein the at least one supported PGM is selected from the group consisting of platinum, palladium and rhodium.

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47. (Previously Presented) The system according to claim 46, wherein the at least one PGM is platinum.

- 48. (Currently Amended) The system according to claim-47\_45, wherein the support is alumina.
- 49. (Currently Amended) The system according to claim 47[[,]] comprising from 10-150g/ft<sup>3</sup> platinum.